Corn Hybrid Polymer Coating Removal
JG-PP Project Number: 06-CR-031

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Background
Coating removal and selective stripping are performed routinely during maintenance, repair, and overhaul activities. Delicate substrates, such as composites and thin aluminum alloys, can be damaged very easily during the coating removal process. Damaging these substrates can cause unnecessary rework, impede performance or reduce part life. In order to prevent damage while removing coatings, chemical strippers and manual coating removal methods, such as pneumatic hand sanding, are utilized. These methods can release solvent vapors into the atmosphere, generate hazardous waste, and expose workers to potentially unsafe working conditions. There is a joint service need to develop and implement environmentally preferred methods to replace chemical strippers and labor-intensive manual decoating methods for these delicate substrates.

An evaluation of corn based blasting media was conducted on U.S. Navy surface ship random sections and passive countermeasure system under the National Defense Center for Environmental Excellence Task No. 308 entitled "Coatings Removal from Delicate Substrates and Application Process Improvements for DoD Industrial Facilities." The results of this evaluation indicated that this type of media provided acceptable stripping rate without damaging the surface of these delicate substrates. Furthermore, bio-based products, such as corn based blasting media, are biodegradable and classified as non-hazardous waste. As a result, their use helps facilities meet many of the environmental compliance, pollution prevention, and toxic chemical use reduction requirements of Executive Order 13148. Additionally, Section 401 of Executive Order 13101 specifically requires Federal agencies to consider the use of bio-based products during acquisition planning and the Farm Security and Rural Investment Act also drives the use of these products. The use of bio-based products may also help facilities improve their generator status, meet waste minimization requirements, and reduce their regulatory burden under the Resource Conservation and Recovery Act.

Objective
The objective of this project is to evaluate corn based blasting media and determine if it meets specific stakeholder requirements and specifications for the removal of coatings from select substrates. This evaluation will include the effectiveness of the process to remove coatings, the cost of coating removal, as well as the ability of the media to meet or exceed identified specifications and requirements. If the process meets stakeholders' minimum requirements, then this project will provide the necessary tools to assist with implementation.

Period of Performance
- September 2005 to July 2007.

Stakeholders
NASA, United States Air Force, Army, and Navy.

Benefits
Vendor proof-of-concept evaluations and demonstrations have been conducted at U.S. Navy, Air Force, U.S. Coast Guard and Army facilities, and the results have indicated that the corn hybrid polymer media has significant potential to meet stakeholder requirements. The coatings removal rates have been deemed acceptable and no substrate damage is incurred during removal. In addition, cost analyses have been completed for several of the delicate substrates, indicating significant potential cost savings upon implementation. Furthermore the moisture resistance and good flowability allow it to be used in all types of plastic media equipment.

Document Status

The JTPs developed for this project include:
- Demonstration of Coatings Removal from Selected Substrates at Naval Submarine Base (NSB) Kings Bay, Trident Refit Facility – Complete
- Demonstration of Coatings Removal from Selected U.S. Army Helicopter Substrates – Complete
- Demonstration and Validation of Corn Based Blasting Media for Coating Removal from Selected Delicate Substrates - Complete.

The JTRs developed for this project include:
- Final Interim Report for Proof of Concept Evaluation of Coating Removal from Selected Substrates, dated May 8, 2006
- Final Interim Report for Demonstration of Coating Removal from Selected Substrates at Naval Submarine Base Kings Bay, GA, dated June 6, 2006
- Final Interim Report for Demonstration of Coating Removal from Selected U.S. Army Helicopter Substrates, dated November 8, 2006
- Final Interim Report for Evaluation of Corn Based Blasting Media for Coatings Removal from Selected Delicate Substrates at NS Mayport, Simmons Army Airfield, and Robins AFB, dated July 19, 2007.
- Final Implementation Plan dated July 5, 2007.

- The National Defense Center for Environmental Excellence coordinated with all of the Department of Defense services to a final demonstration and validation to further assess the performance of the corn hybrid polymer media on U.S. Navy, Air Force, Army, Marine Corps, and NASA identified substrate components. The final demonstration/validation considered any additional testing requirements (i.e., mechanical or electrical testing, microscopic analysis, etc.) that must be achieved prior to implementation. Testing was completed and an interim report developed in July 2007.
- Final Report is currently awaiting ITAR approval.

Milestones

- Completed Proof of Concept evaluation held at Naval Air Station Mayport - February 2006
- Completed Demonstrations held at NAVSUBASE Kings Bay, and Army facilities Fort Rucker and Ft. Bragg – May 2008
- Completed Full demonstration held at Naval Station, Mayport FL - October 2006.
- JGPP Project Closed in July 2007.

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